

REMARKS:

Claims 1-8 are in the case and presented for consideration.

The specification has been amended to refer to the patent that has since been issued on the parent application.

Claim 4 has been amended to make it clear that, as correctly understood by the Examiner, the plasma beam discharge gaps are part of the plasma beam discharge configurations.

The claims and application are therefore now believed to be in proper form under 35 U.S.C. §112.

The Examiner has rejected claims 1, 2 and 4-8 and being obvious and unpatentable over Matsumoto (US Patent 5,340,621), in view of Karner (US Patent 5,753,045). Claim 3 is rejected as being obvious from this combination, taken further in view of David (US Patent 6,015,597).

In Matsumoto, the person of ordinary skill in the art would understand that the plasma sheets 7 are clearly not two or more plasma beams that are parallel to each other. As clearly stated at column 5, line 23 of Matsumoto, the plasma, which is generated, is sheet-shaped. Further it is noted that the gas flow is substantially perpendicular to the plane of the sheet-shaped plasma (see col. 2, line 42 ff. of the reference). It becomes clear that according to Fig. 1 of Matsumoto, the reactive gas molecules are introduced from a gas supplying nozzle which is installed on a side opposite to the substrate. Such molecules will be excited by collision with electrons or ions in the plasma, during their **passage through** the high density plasma. Thus, Matsumoto teaches a gas flow

perpendicular toward and on the substrate and perpendicular and across the sheet-shaped plasma 7.

This teaching of Matsumoto is contrasted to the language of claim 1:

"...the plasma discharge configuration having at least two plasma beam discharge configurations (5, 9) with substantially parallel discharge axes (A) and at least one deposition configuration positioned along a surface (13) which extends at selected distances from the beam axes (A) and along a substantial section of the discharge beam longitudinal extension..." and "...such that a gas flow (G) through the chamber (1) is generated, which is substantially parallel to the discharge axes (A)..."

Further, at column 2, line 48, Matsumoto further teaches that the reactive gas molecule, after having passed the high density plasma, will reach a substrate in a state containing excited particles in high ratio. Thus, the skilled artisan reading Matsumoto understands that the specific gas injection technique across the high density plasma and toward and onto the substrate is an important feature, which is not arbitrarily selected.

This teaching of Matsumoto (e.g. providing a sheet-shaped plasma 7 and providing for a gas supply-arrangement for gas flow that is substantially perpendicular to axes of the pressure gradient) would be understood as being **essential**, as may be seen from col. 2, line 42 of Matsumoto. Thus, Matsumoto clearly does not teach or suggest gas flow in the direction of plasma beam axes and along considerable parts thereof, and modifying this teach would not be obvious from a reading of this reference taken as a whole.

It is also clear that Karner, in fact, teaches a single plasma beam and a beam axes parallel gas flow. Karner discusses, in its introduction (see col. 1, starting at line 45), a German reference DE 40 29 270, which actually corresponds to Karner's US Patent

5,616,373 (Karner'373). Karner '373 makes use of multiple plasma beams and perpendicular gas flows. In the here cited Karner reference, however, (US Patent 5,753,045 of Karner '045) the skilled artisan is told that it has been found that with the arrangement or Karner '373 it is difficult to achieve the same layer quality over large surfaces in a reproducible fashion, (see col. 1, line 59 to 61 of Karner '045).

Thus the combined teaching of Karner '045 and of Matsumoto is:

From Karner '045: one learns of the disadvantage of a plurality of individual plasma beams that are side-by-side with respect to a spatially distributed uniform high plasma density, therefore proposing a single beam parallel gas flow technique to the person of ordinary skill in the art; and

From Matsumoto (which is much earlier than both teachings of Karner): a sheet-shaped plasma approach with perpendicular gas flow.

Departing from Matsumoto with its sheet-shaped plasma and with gas flow perpendicular to the plasma discharge across the plasma-sheet and perpendicularly toward and onto the substrate, it is not obvious for the skilled artisan to replace the sheet-shaped plasma of Matsumoto by two or more single beam shaped plasma discharges as of Karner '045 and to replace Matsumoto's perpendicular gas flow with respect to the discharge and with respect to the substrate, by Karner's '045 axes-parallel gas flows and substrate parallel gas flow, when considering the overall teaching of Karner '045 namely, that a plurality of individual side-by-side plasma beams leads to problems with respect to spatially distributed uniformity of high plasma density.

Karner '045 refers to Karner '373 and thus to a technique that is disadvantageous and which is rather more similar to the present invention than is Matsumoto. The

combination of Karner '045 and Matsumoto thus would actually be contrary to the teaching of both references, so that such a combination cannot be an obvious one.

Only by using hindsight obtained by reading the present application, would the skill artisan be motivated to combine multiple beam plasma generation (not a plasma sheet as in Matsumoto) with a surface arrangement as in Karner '045, taking into account that Karner '045 teaches the recognized drawbacks of the Karner '373 and the multiple beam technique.

Karner '045 thus actually teaches away from applying multiple beam plasma generation for reproducibly high quality large surface treatment.

Claims 1, 2 and 4-8 are therefore believed to be patentable and in condition for allowance.

The David reference goes not overcome the missing teaching of Matsumoto or Karner so that claims 3 should also now be in condition for allowance.

None of the references taken along or in combination are believed to render the claims obvious. The dependent claims are believed to distinguish the invention even further from the prior art and the application and claims are believed to be in condition for allowance.

The Examiner is respectfully invited and urged to telephone the undersigned in order to reach a conclusion to the prosecution of this case.

Respectfully submitted,



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Dated: October 11, 2005

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